UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/554,136	05/12/2006	Hiroshi Kawazoe	3836.001	9371

22337 7590 03/21/2011
LAW OFFICES OF CHARLES GUENZER
P O BOX 60729
PALO ALTO, CA 94306

EXAMINER	
HSIEH, HSIN YI	

ART UNIT	PAPER NUMBER
2811	

MAIL DATE	DELIVERY MODE
03/21/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/554,136	KAWAZOE ET AL.
	Examiner	Art Unit
	Hsin-Yi (Steven) Hsieh	2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 November 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-9,12-15,17-20 and 22-24* is/are pending in the application.

4a) Of the above claim(s) *20 and 23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-9,12-15,17-19,22 and 24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20101105*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/05/2010 has been entered.

Response to Amendment

2. The declaration under 37 CFR 1.132 filed 11/05/2010 is insufficient to overcome the rejection of claims 18-19 based upon 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement, and under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, as set forth in the last Office action because:

3. It refer(s) only to the system described in the above referenced application and not to the individual claims of the application. See MPEP § 716. The declaration only addresses the new matter objection to the specification.

Information Disclosure Statement

4. The information disclosure statement (IDS) submitted on 11/05/2010 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Specification

5. The amendment filed 04/16/2010 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the amendment of replacing "the conduction band edge" with "the valence band edge" in the paragraph at pages 23, line 24 to page 24, line 6.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. **Claims 18-19 and 24** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

8. Claim 18 recites "the p-electrode has a work function higher than a valence band edge energy of the inorganic semiconductor material" in the last two lines of the claim which is different form what is disclosed in the original disclosure: "the work function of the p-electrode is higher than the conduction band edge energy of the ambipolar inorganic semiconductor" as disclosed in the first two lines of page 24.

9. Claim 24 recites the limitations "a first common reference energy level" and "a second common reference level" in the last four lines of the claim, which lacks the full support of the original disclose. The original disclosure does not mention these two limitations at all.

10. Claim 19 is rejected because they depend on the rejected claim 18.

11. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

12. **Claims 18-19 and 24** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

13. Claim 18 recites "a conduction band edge energy" in the 11th line of the claim, while a reference energy level is not defined. The energy level of the conduction band edge is only meaningful when a reference energy level, i.e. 0 energy level is defined. Without defining the reference energy level, the conduction band edge energy is ambiguous. Applicant is advised to specify the reference energy level or use a term that already has the reference level defined, e.g. electron affinity.

14. Claim 24 recites the limitations "a first common reference energy level" and "a second common reference level" in the last four lines of the claim, without defining the positions of

these two energy levels. Because the positions of these two energy levels affect the actual values of the conduction band edge energy and the valance band edge energy, the values of the conduction band edge energy and the valance band edge energy are indefinite if the common reference levels are not specified.

15. Claim 19 is rejected because they depend on the rejected claim 18.

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

17. The factual inquiries set forth in Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

18. **Claims 1-2, 4-9, 12-1, 17-19, 22 and 24** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawazu et al. (US 5,539,239 A) in view of Shimizu et al. (US 2003/0063462 A1) as can be understood since claims 18-19 and 24 have been rejected under 35 U.S.C. 112.

19. Regarding **claim 1**, Kawazu et al. teach a light-emitting diode (semiconductor light emitting element; Abstract) characterized by comprising: an electron injecting electrode, that is,

an n-electrode (n type ZnSe cladding layer 5; Fig. 1, col. 7 lines 13-14); a hole injecting electrode, that is, a p-electrode (p type ZnSe cladding layer 3; Fig. 1, col. 7 line 8); and an inorganic light-emitting layer (undoped ZnSe active layer 4; Fig. 1, col. 7 lines 11-12) wherein the inorganic light-emitting layer (4) (1) is formed of an inorganic semiconductor material (undoped ZnSe; col. 7 lines 11-12) having an ambipolar property in which the ratio of respective mobilities of electrons and holes is in a range of 1/10 to 10 (undoped ZnSe has this property), (2) is disposed between the n-electrode (5) and the p-electrode (3) so as to respectively contact the n-electrode and the p-electrode (5 and 3) in a non-barrier junction manner (5, 4, 3 form a p-i-n diode which is considered in a non-barrier junction manner as the diode conducts in the forward biased condition) such that the inorganic semiconductor material (undoped ZnSe) conducts both electrons injected from the n-electrode (5) and holes injected from the p-electrode (3; conducting both electrons and holes is an intrinsic property of undoped ZnSe), wherein the inorganic light-emitting layer (4) emits light resulting from electrons injected from the n-electrode (5) and holes injected from the p-electrode (3) recombining between the two electrodes (5 and 3; the light emitting is a intrinsic property of this PIN diode), and wherein the inorganic semiconductor material having the ambipolar property (undoped ZnSe) is selected from the group consisting of (a) a group II-VI compound and (b) Zn and at least one element selected from the group consisting of S, Se and Te (i.e. Zn and Se).

Kawazu et al. do not teach the inorganic light-emitting layer is formed on a glass substrate, the inorganic light-emitting layer has a thickness in a range of 100 nm or more and 10 μm or less, the inorganic semiconductor material formed on the glass substrate.

Kawazu et al. teach the inorganic light-emitting layer (3) has a thickness of 10 nm (col. 7 lines 11-12) which is close enough to the claimed range of 100 nm or more and 10 μm or less that one skilled in the art would have expected them to have the same properties, which establishes a prima facie case of obviousness (MPEP 2144.05 [R-5] I).

Furthermore parameters such as the thickness of the inorganic light-emitting layer in the art of semiconductor manufacturing process are subject to routine experimentation and optimization to achieve the desired film quality during device fabrication. Therefore, it would have been obvious to one of the ordinary skill in the art at the time the invention was made to incorporate the thickness of the inorganic light-emitting layer within the range as claimed in order to form a high quality film.

In the same field of endeavor of LEDs, Shimizu et al. teaches the inorganic light-emitting layer (the light emitting layer of the LED chips 72 which can be a ZnSe-based LED; paragraph [0069, 0143, and 0144]) formed on a glass substrate (heat-dissipating substrate 73 which can be a glass epoxy substrate; Figs. 16A and 16B, paragraph [0144]), the inorganic semiconductor material (the light emitting layer of the LED chips 72 which can be a ZnSe-based LED) formed on the glass substrate (73).

It would have been obvious to one of ordinary skill in the art at the time of invention was made to combine the inventions of Kawazu et al. and Shimizu et al. and use the glass substrate as taught by Shimizu et al., because the glass substrate can dissipate the heat generated by the LED chip and increase the lifetime of the LED chip as taught by Shimizu et al. (paragraph [0144]).

20. Regarding **claim 2**, Kawazu et al. also teach the light-emitting diode according to claim 1, characterized in that the inorganic light-emitting layer (4) consists of a semiconducting

material (undoped ZnSe) having a dopant concentration of 0.1% or less in atomic ratio (zero as it is undoped).

21. Regarding **claim 4**, Kawazu et al. also teach the light-emitting diode according to claims 1 or 2, characterized in that the n-electrode (5) includes a layer (5) comprising an n-type dopant (Cl; col. 7 line 15) and the inorganic semiconductor material having the ambipolar property (ZnSe; col. 7 lines 13-14).

22. Regarding **claim 5**, Kawazu et al. also teach the light-emitting diode according to any claims 1 or 2, characterized in that the p-electrode (3) includes a layer (3) comprising a p-type dopant (N; col. 7 line 10) and the inorganic semiconductor material having the ambipolar property (ZnSe; col. 7 line 8).

23. Regarding **claim 6**, Kawazu et al. also teach the light-emitting diode according to claims 1 or 2, characterized in that the n-electrode (5) includes a first layer (5) comprising an n-type dopant (Cl; col. 7 line 15) and the inorganic semiconductor material having the ambipolar property (ZnSe; col. 7 lines 13-14), and the p-electrode (3) includes a second layer (3) comprising a p-type dopant (N; col. 7 line 10) and the inorganic semiconductor material having the ambipolar property (ZnSe; col. 7 line 8).

24. Regarding **claim 7**, Kawazu et al. also teach the light-emitting diode according to claims 1 or 2, characterized in that a material (ZnSe) of a portion contacting the light-emitting layer (4) in at least one of the n-electrode (5) and the p-electrode (3) is formed by use of a material (ZnSe) substantially different from the material of the light-emitting layer (CdZnSe of the CdZnSe-ZnSe multi-quantum well layer 21; Fig. 6, col. 2 lines 42-43)

25. Regarding **claim 8**, Kawazu et al. also teach the light-emitting diode according to claims 1 or 2, characterized in that the n-electrode (5) and the p-electrode (3) are formed on opposing sides of the inorganic semiconductor material having the ambipolar property (4), wherein the n-electrode (5) and the p-electrode (3) do not contact each other (see Fig. 1).

26. Regarding **claim 9**, Kawazu et al. also teach the light-emitting diode according to claims 1 or 2, characterized in that a first one of the n-electrode (5) and the p-electrode (3) is formed on a crystalline substrate or a glass substrate (GaAs substrate 1; Fig. 1, col. 7 line 4), and the inorganic semiconductor material having the ambipolar property (4) is stacked thereon (4 is stacked on 1), and a second one of the p-electrode (5) and the n-electrode (3) is stacked thereon (5 and 3 are stacked on 1).

27. Regarding **claim 12**, Kawazu et al. also teach the light emitting diode according to claim 1, wherein only one such light-emitting layer (4) is formed between the p-electrode (3) and the n-electrode (5).

28. Regarding **claim 13**, Kawazu et al. also teach a light-emitting diode (semiconductor light emitting element; Abstract), comprising: an electron injecting n-electrode (n type ZnSe cladding layer 5; Fig. 1, col. 7 lines 13-14); a hole injecting p-electrode (p type ZnSe cladding layer 3; Fig. 1, col. 7 line 8); an ambipolar light-emitting layer (undoped ZnSe active layer 4; Fig. 1, col. 7 lines 11-12) (1) continuously extending from the n-electrode (5) to the p- electrode (3; see Fig. 1), (2) consisting of an ambipolar semiconducting material (undoped ZnSe, an ambipolar material which can transport electrons and holes; col. 7 lines 11-12) which conducts both electrons injected by the n-electrode (5) and holes injected by the p-electrode (3; conducting both electrons and holes is an intrinsic property of undoped ZnSe), and (4) comprising a first

semiconductor material (ZnSe) selected form the group consisting of (a) a group II-VI compound and (b) Zn and at least one element selected from the group consisting of S, Se and Te (i.e. ZnSe).

Kawazu et al. do not teach an ambipolar light-emitting layer whjch is formed on a glass substrate, having a thickness in a range of equal to or greater than 100 nm and no more than 10 μm.

Kawazu et al. teach an ambipolar light-emitting layer (3) having a thickness of 10 nm (col. 7 lines 11-12) which is close enough to the claimed range of 100 nm or more and 10 μm or less that one skilled in the art would have expected them to have the same properties, which establishes a prima facie case of obviousness (MPEP 2144.05 [R-5] I).

Furthermore parameters such as the thickness of the ambipolar light-emitting layer in the art of semiconductor manufacturing process are subject to routine experimentation and optimization to achieve the desired film quality during device fabrication. Therefore, it would have been obvious to one of the ordinary skill in the art at the time the invention was made to incorporate the thickness of the ambipolar light-emitting layer within the range as claimed in order to form a high quality film.

In the same field of endeavor of LEDs, Shimizu et al. teaches an ambipolar light-emitting layer (the light emitting layer of the LED chips 72 which can be a ZnSe-based LED; paragraph [0069, 0143, and 0144]) whjch is formed on a glass substrate (heat-dissipating substrate 73 which can be a glass epoxy substrate; Figs. 16A and 16B, paragraph [0144]).

It would have been obvious to one of ordinary skill in the art at the time of invention was made to combine the inventions of Kawazu et al. and Shimizu et al. and use the glass substrate as

taught by Shimizu et al., because the glass substrate can dissipate the heat generated by the LED chip and increase the lifetime of the LED chip as taught by Shimizu et al. (paragraph [0144]).

29. Regarding **claim 14**, Kawazu et al. also teach the light-emitting diode of claim 13, wherein the ambipolar light-emitting layer (4) consists of the first semiconductor material (ZnSe; col. 7 lines 11-12).

30. Regarding **claim 15**, Kawazu et al. also teach the light-emitting diode of claim 13, wherein the first semiconductor material (ZnSe) is Zn and at least one element selected from the group consisting of S, Se and Te (i.e. Se).

31. Regarding **claim 17**, Kawazu et al. also teach the light-emitting diode according to claim 1, wherein the light-emitting layer (4) consists essentially of the inorganic semiconductor material having the ambipolar property (ZnSe; col. 7 lines 11-12).

32. Regarding **claim 18**, Kawazu et al. teach a light-emitting diode (semiconductor light emitting element; Abstract) characterized by comprising: an electron injecting electrode, that is, an n-electrode (n type ZnSe cladding layer 5; Fig. 1, col. 7 lines 13-14); a hole injecting electrode, that is, a p-electrode (p type ZnSe cladding layer 3; Fig. 1, col. 7 line 8); and an inorganic light-emitting layer (undoped ZnSe active layer 4; Fig. 1, col. 7 lines 11-12), wherein the light-emitting layer (4) is disposed between the n-electrode (5) and the p-electrode (3) so as to respectively contact the n-electrode (5) and the p-electrode (3; see Fig. 1) and is formed of an inorganic semiconductor material having an ambipolar property (ZnSe) in which the ratio of respective mobilities of electrons and holes is in a range of 1/10 to 10 (ZnSe has this property), wherein the inorganic light-emitting layer (4) emits light resulting from electrons injected from the n-electrode (5) and holes injected from the p-electrode (3) recombining between the two

electrodes(5 and 3; the light emitting is a intrinsic property of this PIN diode), wherein the inorganic semiconductor material having the ambipolar property (ZnSe) is selected from the group consisting of (a) a group II-VI compound and (b) Zn and at least one element selected from the group consisting of S, Se and Te (i.e. Zn and Se), wherein the n-electrode (n type ZnSe) has a work function lower than a conduction band edge energy of the inorganic semiconductor material having the ambipolar property (undoped ZnSe), and wherein the p-electrode (p type ZnSe) has a work function higher than a valence band edge energy of the inorganic semiconductor material having the ambipolar property (undoped ZnSe; this relationship of work functions, the conduction band edge energy, and the valence band edge energy is intrinsically satisfied as the three layer structure of p-ZnSe/undoped_ZnSe/n-ZnSe with undoped ZnSe as the active layer is exactly the same as the examples shown in the second paragraph of page 25 of the instant application).

Kawazu et al. do not teach an inorganic light-emitting layer has a thickness in a range of 100 nm or more and 10 μm or less.

Kawazu et al. teach an inorganic light-emitting layer (3) has a thickness of 10 nm (col. 7 lines 11-12) which is close enough to the claimed range of 100 nm or more and 10 μm or less that one skilled in the art would have expected them to have the same properties, which establishes a prima facie case of obviousness (MPEP 2144.05 [R-5] I).

Furthermore parameters such as the thickness of the inorganic light-emitting layer in the art of semiconductor manufacturing process are subject to routine experimentation and optimization to achieve the desired film quality during device fabrication. Therefore, it would have been obvious to one of the ordinary skill in the art at the time the invention was made to

incorporate the thickness of the inorganic light-emitting layer within the range as claimed in order to form a high quality film.

33. Regarding **claim 19**, Kawazu et al. also teach the light-emitting diode of claim 18, wherein the inorganic light-emitting layer (4) contacts the n-electrode (5) without forming a barrier therebetween (the intrinsic property of n type ZnSe and undoped ZnSe) and the inorganic light-emitting layer (4) contacts the p-electrode (3) without forming a barrier therebetween (the intrinsic property of p type ZnSe and undoped ZnSe).

34. Regarding **claim 22**, Kawazu et al. also teach the light-emitting diode of claim 1, wherein the inorganic light-emitting layer (4) contacts the n-electrode (5) without forming a barrier therebetween (the intrinsic property of n type ZnSe and undoped ZnSe) and the inorganic light-emitting layer (4) contacts the p-electrode (3) without forming a barrier therebetween (the intrinsic property of p type ZnSe and undoped ZnSe).

35. Regarding **claim 24**, Kawazu et al. also teach the light emitting diode of claim 18, wherein the work function of the n-electrode (5) and the conduction band edge energy (of 3) are measured relative to a first common reference energy level (vacuum energy level) associated with the n-electrode (5) and the work function of the p-electrode (3) and the valence band edge energy (of 3) are measured relative to a second common reference energy level (vacuum energy level) associated with the p-electrode (3; the work functions, conduction band edge energy, the valence energy edge energy, and common reference energy levels are all intrinsic properties of the three layer structure of p-ZnSe/undoped_ZnSe/n-ZnSe).

Response to Arguments

36. Applicant's amendments, filed 11/05/2010, overcome the objections to claim 6 and the rejections to claim 16 under 35 U.S.C. 112. The objections to claim 6 and the rejections to claim 16 under 35 U.S.C. 112 have been withdrawn. The objections to specification and the rejections to claims 18 and 19 under 35 U.S.C. 112 still stand.

37. Regarding to the new matter objection to specification, the applicant argues that the amendment is to correct a technical error using support of the declaration from Dr. Mashiro ORITA and Prof. Hiromichi OHTA who quote the textbook of "Semiconductor Physical Electronics" by Sheng S. Li. The examiner respectfully disagrees because the disclosure of Li is not consistency with the disclosure from Dr. Mashiro ORITA and Prof. Hiromichi OHTA. Dr. Mashiro ORITA mentioned that the work function of the electrode which emits holes must be higher than the valence band edge energy to have no energy barrier. The book of Li teaches that the work function of the electrode which emits holes must be higher than **the difference between the valence band edge energy and the vacuum level** to have no energy barrier (equation (10.14)). Please also see Sze, "Physics of Semiconductor Devices", 1981, John Wiley & Sons, second edition, pp. 246-247 attached in this Office Action, which explains the definitions of the work function and the electron affinity and their relationships to the barrier height of electrons and holes. Thus the amendment does not correct the technical error.

38. Regarding to the written description rejection of claims 18 and 19, Applicant argues that the claims would be adequately support in the description of the invention if the new matter

rejection of the specification is removed. As the new matter rejection of the specification still stands, the written description rejection of claims 18 and 19 also stands.

39. Regarding to the rejection of claims 18 and 19 under 35 U.S.C. 112 second paragraph, Applicant argues that the claim language is not ambiguous because any reference energy level can be used and in the differencing the reference energy of whatever value disappears. The examiner disagrees because the value of the conduction band energy depends on the reference energy and there is no differencing involved.

40. Applicant's arguments with respect to claims 1 and 13 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hsin-Yi (Steven) Hsieh whose telephone number is 571-270-3043. The examiner can normally be reached on Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Lynne A. Gurley can be reached on 571-272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lynne A. Gurley/
Supervisory Patent Examiner, Art Unit 2811

/H. H./
Examiner, Art Unit 2811
3/10/2011